2.3.14. Velocity Resolution

2.3.14.1. Purpose

The purpose of this test is to determine the minimum resolvable velocity difference between two targets in the VS radar mode and to assess the effects that this resolution has upon tactics.

2.3.14.2. General

The VS modes determine target bearing and closure rate, therefore, to resolve two targets, the radar must be able to detect the difference between the targets' azimuths or the targets' closure rates. The azimuth resolution was determined during the range and azimuth resolution tests. In a VS mode, while the targets are closer in azimuth than the azimuth resolution limit, they will only become distinct as two targets if they differ in speed by the velocity resolution limit. As with the previously discussed resolution tests, velocity resolution is important as a tool for raid counting and assigning the correct number of assets to the appropriate groups of targets or "cells".

2.3.14.3. Instrumentation

Data cards and an optional voice recorder are required for this test.

2.3.14.4. Data Required

Record both targets' heading, h_{po}, V_o, OAT_o and winds aloft as well as the radar bearing to the target when the two targets just become resolvable as two separate targets on the VS display.

2.3.14.5. Procedure

Perform the out of clutter (high/medium altitude) maximum detection range test using the VS mode with both targets aligned along the same bearing from the test airplane and in a 300 feet trail formation at the same airspeed. After solid detection, call for the trail airplane to decelerate at approximately 1 knot per second while the lead airplane maintains a constant airspeed and both airplanes remain aligned along the bearing to the test airplane. The alignment can be set up and easily maintained by flying the same TACAN radial. If the trail target loses visual contact with the lead, have him climb 1,000 feet above the lead for safety purposes. When the test airplane is able to break the trail airplane out on the display, the test airplane should call a mark on the radio and the data either passed to the test airplane or recorded internal to the target airplane. If radio calls are used, record the trail airplane's data first since his or her airspeed may not be completely stabilized and may change before it can be recorded. The winds aloft can be obtained by the methods outlined in the groundspeed/course/altitude accuracy tests.

2.3.14.6. Data Analysis and Presentation

Use the procedure outlined in the groundspeed/course/altitude accuracy tests to determine the groundspeed components along the line of bearing between the targets and test airplane for both the targets at the time they are resolved. The difference between the two groundspeeds is the minimum resolvable closure rate difference. Relate this resolution to the effect it will have upon raid count and the optimum assignment of fighters to inbound cells.

2.3.14.7. Data Cards

A sample data card is presented as card 18.

CARD NUMBER ___ TIME ____ PRIORITY L/M/H

VELOCITY RESOLUTION

[PERFORM A MAXIMUM DETECTION RANGE TEST IN THE VS MODE WITH THE TARGETS LINED UP ON THE SAME TACAN RADIAL THAT THE TEST AIRPLANE IS FLYING. AFTER OBTAINING SOLID DETECTION, HAVE THE TRAIL AIRPLANE SLOW AT 1 KNOT PER SECOND. IF VISUAL CONTACT IS LOST BETWEEN THE TARGETS HAVE THE TRAIL TARGET CLIMB 1,000 FEET. CALL A MARK AT THE TARGET BREAK OUT AND RECORD DATA CALLS FIRST FROM THE TRAIL, THEN THE LEAD AIRPLANES.]

BEARING TO THE TARGET:

	HEADING	h_{po}	V_o	OAT_o	WINDS ALOFT
LEAD					
TRAIL					

[EVALUATE THE EFFECTS OF THE VELOCITY RESOLUTION UPON TACTICS DURING MISSION RELATABLE INTERCEPTS.]

EFFECTS:

Card 18: Velocity Resolution Data Card